



The Raleigh Amateur Radio Society's **EXCITER**

GET INVOLVED

- RARS General Membership meeting: Second Tuesday of the month.
- The RARS net meets every night except Saturday @ 8 p.m. on 146.640.
- The RARS Technical & Trader's net: Saturdays @ 8:00 PM on 146.64.
- ~~RARS meets for a monthly dinner on the First Tuesday of each month.~~



PUBLIC SERVICE EVENTS

Interested in helping? Visit <https://www.rars.org/public-service.php>

frequently for our 2020 ham public service schedule.

RARS General Meeting

Main Topic: RARS Officers nominations and Show and Tell via Zoom

Presenter: Election committee & Club members

Date: October 13, 2020

Time: Meeting at 7:30 PM, informal gathering at 7PM on Zoom.

Where: Zoom

Presidents Comments

One topic of general interest to all hams is the proposal by the FCC to begin charging a \$50 fee for ham licenses, renewals, vanity call signs, and other changes to license status. Administrative updates, such as address changes, would not be subject to the fee.

The FCC argues that ham licensees should share the administrative cost of the universal licensing system, and that the so-called "Ray Baum's Act" of 2018 requires a cost-based fee structure, superseding the previous fees set by Congress in earlier laws.

[Continued on page 4](#)

RARS Officers

PRESIDENT

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VICE PRESIDENT

Tom Lewis
N4TL
N4TL2@yahoo.com

SECRETARY

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TREASURER

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The Raleigh Amateur Radio Society

The Raleigh Amateur Radio Society, Inc. (RARS) was founded in 1969 and continues to serve and support the amateur radio community in the greater Triangle area. In 1999, the society incorporated a new RARS and obtained 501(c)(3) non-profit tax status.

The objectives of the club are to promote worldwide friendship through amateur radio; to be of public service by providing radio communications in times of disaster, emergency, or civic needs; to educate members in radio technique, and to provide training classes to assist in obtaining amateur radio licenses.

Anyone interested in amateur radio is eligible to apply for membership. Dues for regular licensed amateurs are \$18 per year (from July 1 through June 30). Additional immediate family members pay \$5 each per year. Dues for licensed amateurs older than 59 or younger than 16 are \$12 per year. Dues for non-licensed associate members are \$9 per year. Applications for membership may be obtained from the treasurer or on the RARS website.

<https://www.rars.org>

Exciter

The Exciter is the official newsletter of the Raleigh Amateur Radio Society. It appears each month as a PDF on the RARS website at www.rars.org. Members receive email notification when the latest version is available. Please provide your email address to the Treasurer.

The Exciter welcomes articles, advertisements, and other contributions. To submit a piece to the newsletter, please contact the Editor. The Editor reserves the right to edit any and all pieces. The submission deadline for each month's Exciter is the Saturday that is ten days before the general meeting. All submissions must be final. Drafts are not accepted.

The views expressed in the Exciter are those of the individual authors and do not necessarily reflect the views of the Editor or RARS.

Tom Lewis, N4TL, editor (editor@rars.org)

For Your Information

RARS General Meeting

Date: Second Tuesday of each month

Location: Ridge Road Baptist Church 2014
Ridge Road Raleigh, NC, 27607

Time: People begin arriving at 7 p.m. The
meeting officially begins at 7:30 p.m.

RARS Monthly Dinner

All members and guests are welcome to the monthly (first Tuesday) RARS Supper, 6:30PM, at the IHOP Restaurant, 7471 Six Forks road, 27615. Its on the corner of Six Forks road and Sawmill Road, 6:30 PM to 8PM They have a room for us that is to the left when you enter the restaurant. Informal and Dutch, just bring your appetite and best rag to chew.

RARS Repeaters in Raleigh

145.130, 146.640 and 444.525

Join us for the nightly RARS net at 8 p.m. on the 146.640 repeater. All hams holding a Technician class license or higher are invited to check in. We welcome both RARS and non-RARS members to the net.

There is a net Listing on the RARS website click here. <https://www.rars.org/nets.php>

VE Testing

The RARS VEs will accept walk-in testing in February, May, August and November at 5:30PM, prior to RARS membership meetings at Ridge Road Baptist Church; the RARSfest in April; the Cary Swapfest in July; the JARS-Fest in November; and following RARS license classes. Please bring a photo ID, your original and a copy of your current license, your \$14 exam fee, and any valid CSCEs that prove passing elements beyond that of your current license. Visit <https://www.rars.org> for more information.

RARS Net Monthly Summary

September

Checkins: 537

Minutes: 1213

Sessions: 30

Virginia Enzor NC4VA

RARS Net Manager



Presidents Comments continued

We all have our own opinions about how government services should be funded. Hams disagree about the appropriateness of the proposed fees, and on questions of whether new hams or young hams should be charged the same fees. Whatever your opinion on these matters, now is the time to let the FCC know what you think. The Electronic Comment Filing System is open for comments, here: <https://www.fcc.gov/ecfs/filings/express>. Be sure to mention that your comments apply to MD Docket No. 20-270. You may also wish to contact your Congressional representative and both North Carolina senators.

More detailed information on this subject is on the <https://www.rars.org/> web site, on the main page about half way down.

Many of us are designers, builders and restorers on our own workbenches. The next meeting of RARS on October 13 is our annual “show and tell” meeting. If you have a project, you’d like the rest of us to know about, please plan to show it at the upcoming meeting. It might take some ingenuity to show and tell on Zoom, but with your web cam and photographs, we should all be able to figure out a clever way to present our work.

Projects need not be limited to the subject of ham radio. Any project related to radio, preparedness, electronics, or, heck, just about any work you’re especially please with and want the rest of us to see.

Tom Lewis, N4TL, is organizing the show and tell portion of our meeting. If you plan to participate, please send Tom an email from the RARS website’s Officers/Contacts page, here: <https://www.rars.org/contacts.php> . If you want to, you can send your photographs to Tom and he will show them during the meeting while you talk about them.

The recruitment committee has worked hard to present a slate of candidates for next year’s club officers and members of the board of directors. As set by our bylaws, these candidates will be introduced to the membership at this October meeting, to be voted on at the November meeting.

I look forward to seeing you on Zoom, October 13.

John Honeycutt, N8ZU, RARS President

September 8, 2020 RARS meeting

Doug Hall, K4DSP gave a very good presentation on antenna tuners. They are actually impedance matching networks. The presentation is located at this website.

https://docs.google.com/presentation/d/1YISdJwNkKyjGIv49vmq5G2FcXE0MpW_wmiVjoVN1NCc/edit?usp=sharing

What We'll Cover

- Why use a tuner?
- How they work
- Antenna tuner building blocks - the L-network
- T and Pi networks
- Impedance matching - just a quick overview
- Examples of tuners using different topologies
- Adjusting a tuner
- Antenna tuner downsides
- Automatic antenna tuners
- Open wire feedlines
- Selecting (or building) an antenna tuner
- Antenna tuner alternatives
- Wrap up



Doug Hall, K4DSP, in his home station

September 8, 2020 RARS meeting, continued

An antenna tuner, a.k.a. tuner, coupler, ATU, matchbox, transmatch, is a device that provides impedance matching between a transmitter (usually 50 ohms) and an antenna system of different (and sometimes unknown) impedance.

ATUs are commonly used to:

- Allow operation at band edges where SWR may cause the solid state transmitter to fold back
- Allow operation with non-resonant antennas

Adjusting a T-Network ATU (Courtesy of Tom, N8JI)

Unlike the L network which has only one setting for a given load impedance, a T network can provide a match at multiple settings. And many tuners use the T-network. How do we find the best setting?

We want the lowest inductance setting with the maximum capacitor setting that provides a match. If you always set your capacitors at mid-scale to start (as is often recommended) and adjust the inductor for a dip in SWR you run the risk of obtaining a match with higher loss. Recommended capacitor settings to begin are:

160/80M - max (fully meshed)

60 - 20M - $\frac{3}{4}$ meshed

15 - 10M - $\frac{1}{2}$ meshed

Finally, when putting a new tuner in service (or when changing your antenna system) check for inductor heating and capacitor arcing.

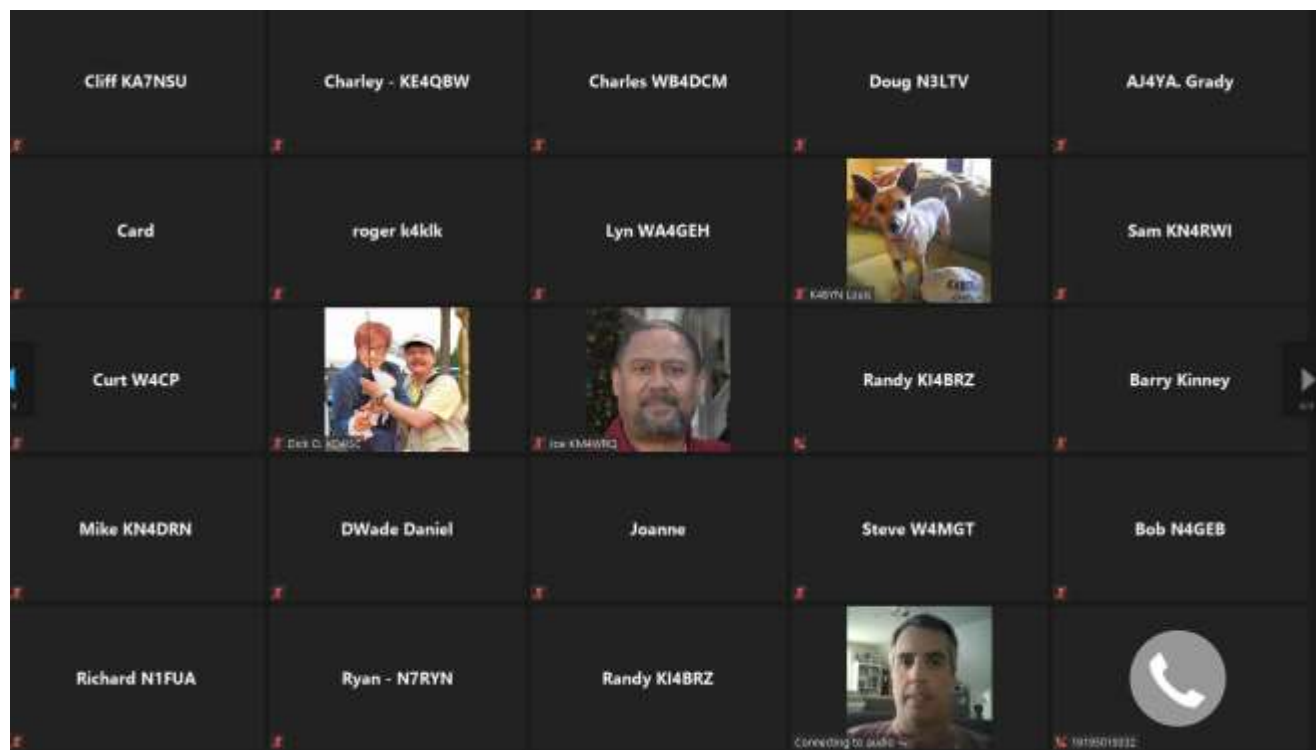
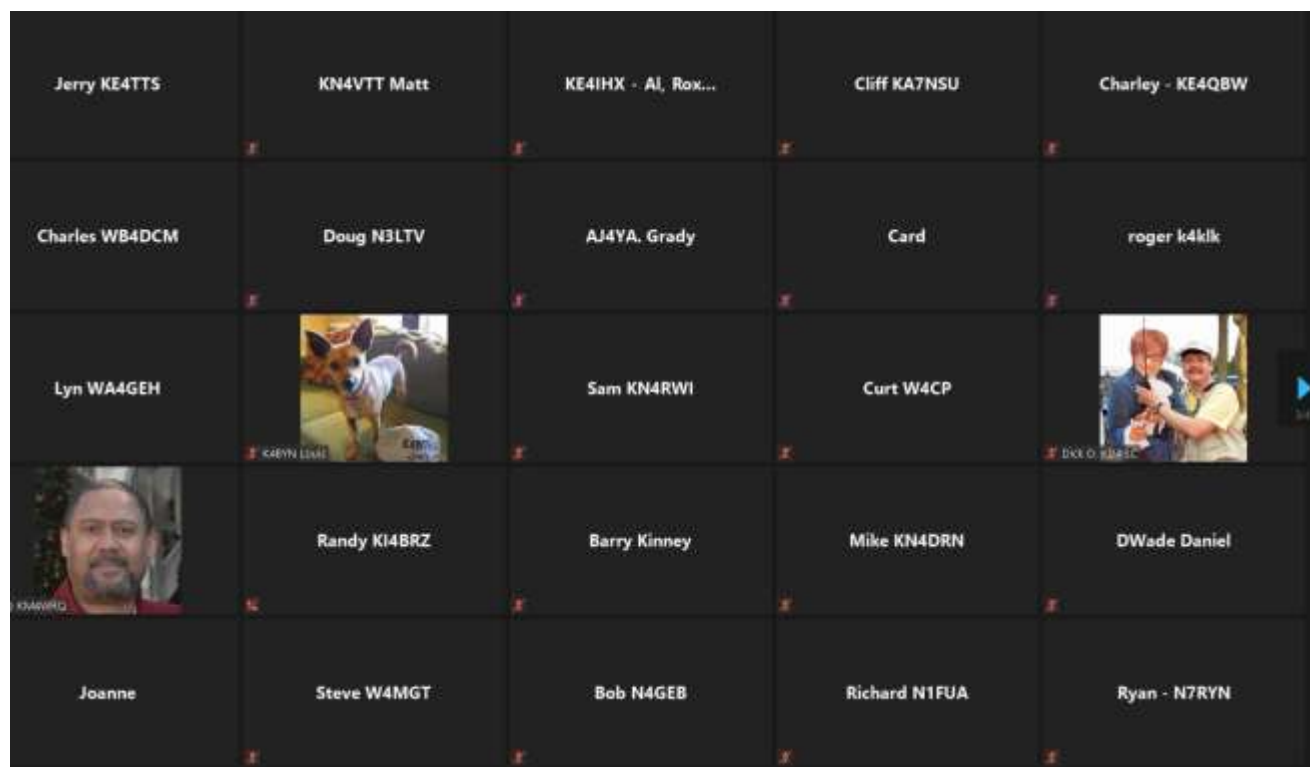
Two slides from Doug's presentation

September 8, 2020 RARS meeting, continued



Screen captures during the Zoom meeting

September 8, 2020 RARS meeting, continued



Screen captures during the Zoom meeting

Future RARS Meeting Topics

Titles, topics, and speakers subject to change.

Date	Topic	Presenter
10/13/2020	RARS Officers nominations and Show and Tell via Zoom	Election committee & members
11/10/2020	RARS Officers election and The IEEE MOVE truck: a mobile Communications & Power platform for disaster response. https://move.ieeeusa.org/	Election committee & Jay Diepenbrock, KM4EP
12/8/2020	RARS Officers induction & TBD	Election committee

Show and Tell

This month's meeting presentation is Show and Tell. Some members have said they have a hard time getting their camera to the item they want to show. Therefore, to solve this problem, everyone can send a picture(s) of the item to me, N4TL2@yahoo.com. During the meeting, I will show the picture(s) on Zoom and the club member can talk about it. So think about what you want to show during the meeting. 73 Tom N4TL

The next few meeting of RARS will be held using Zoom at 7:30PM. Zoom is a conferencing application that runs on computers, tablets and phones. The meeting ID will be sent out to everyone via email.

Quick start guide for new Zoom users

https://support.zoom.us/hc/en-us/articles/360034967471-Quick-start-guide-for-new-users#h_b0c98dfa-d90f-486d-9617-71ab7b41a273

Zoom help center

<https://support.zoom.us/hc/en-us>

During all of our Zoom meetings please edit your name so your call is shown. Do a right click on your own image and choose rename. Add your call after your name. Thanks.

<https://www.rars.org>

RARS Birthdays

David	KN4OBW	10/
Kathryn	KM4RNE	10/01
Philip	KD5IPH	10/01
Scott	AB4SL	10/01
Jay	KM4EP	10/02
Jerry	W2GLA	10/02
Pete	K4PHS	10/02
Olivia	KG4IYI	10/02
Gary	KM4TCT	10/08
Todd	AG4AY	10/08
Rick	KA3PSK	10/09
Scott	W4JSK	10/10
Gale	K4GGB	10/10
Frank	KY4W	10/11
Pamela	KM4WRN	10/13
Jack	KI4KEP	10/14
David	WA4DAG	10/14
Donnie	KO4FWI	10/16
Mike	K4DRT	10/19
Joey	KE4DRJ	10/21
JC	KK4VUS	10/22
Gary	KN4AQ	10/22
Bob	KN4MRV	10/22
Curt	W4CP	10/23
Mike	N9MDS	10/26
Lou	W2ROW	10/27
Chuck	K4RGN	10/27
Matthew	KN4VTT	10/28

*Everyone is
welcome!*



Every Thursday there is a “**Taco Thursday**” Lunch at the Taco Bell, 7036 Knightdale Blvd, Newbern Ave. (Business 64) in Knightdale. We eat outside so bring a chair and Join the Tailgate Party. Weather permitting.

Once in a while a **Free Hamfest** is held at the Pleasant Valley Shopping Center. To find the next date go to the entry for AB4OZ in QRZ.COM. Alan posts the information there.

New Members

Denny Oestreich	KO4IBL
Andrea Smith	
John Izzo	KO4HLP
Brian Higgins	KO4HAR
Ralph Meeks, Jr	WB4EJJ
Dan Mazzella	KO4GOY
Ben Huey	WO8H
John Ruff	K4RUF

AB4OZ HamFest was Saturday October 3, 2020

Alan puts the Hamfest information on QRZ.com under his call. [QRZ.COM](https://www.qrz.com).

Martin Brossman recorded two videos during the Hamfest and put them on YouTube.

<https://www.youtube.com/watch?v=ZyPNrCo11L0>

Alan, AB4OZ is at 2:31

Dennis, WZ0Q at 2:48

Chuck, K4HF at 2:56

Tom, N4TL at 3:03 to 3:14, I was looking at my camera.

This one is about the Johnson Amateur Radio Society Communication Vehicle.

<https://www.youtube.com/watch?v=KX-gRZzkdXU>

Mark Gibson, N4MQU, conducted amateur radio exams during the Hamfest. More information on future testing is at this website.

<http://www.fivecountyhre.org/ab4oz/> and here <http://www.fivecountyhre.org/>

73 Tom N4TL

Deepest Sympathies

A transfer of \$50 has been made to the RARS / Dick Bitner Youth Education fund in memory of NC7MT,

William "Bill" Patterson, Jr (February 8, 1947 – August 30, 2020)

<https://www.dignitymemorial.com/obituaries/raleigh-nc/william-bill-patterson-9331252>



<https://www.rars.org>

Interesting Websites and Information

Old Equipment Paints

This place has 14 different colors of old equipment paints. Collins, Johnson, Hallicrafters, Heath-kit, Kenwood and Yaesu.

<https://vintagetimepieces.org/product-category/custom-equipment-paints/>

Excellent demonstration of radio waves and antennas

Everything you wanted to know about antennas by Frank Rutter K3AW (sk).

<https://www.youtube.com/watch?reload=9&v=LEigIMS6bo4>

Frank does a demonstration of radio waves and antennas.

He has a 3 GHz transmitter on an aluminum ground plane. He changes transmitting antennas and shows the differences. He also shows polarization of the antennas.

Antique Wireless Association

<https://antiquewireless.org/homepage/>

The 2020 Conference was held on line. All the presentations are available at this website.

<https://www.youtube.com/playlist?list=PLLTogcYJemH767GmCRNo5n4mryV1Ssg0c>

The AWA recently added two videos to the [YouTube Channel](#), both are silent movies from the 1920's, with an added musical soundtrack.

The first is "[Building a Freed Radio](#)", which I believe was filmed in mid 1929, at the Freed-Eisemann factory in Allwood, New Jersey, shortly before the company went into receivership as a result of the Great Depression. When the movie was made the Freed factory was packed full of people, producing trainloads of radios, with no hint of the hard times that followed.

The second release is a mid 1920s film titled "[The Pulse of the World](#)", which shows, in surprising detail, the operations of the Mackay System and its global telegraph network. From repairing an undersea communications cable to operating a major message center, this movie covers it all.

<https://www.rars.org>

Interesting Websites and Information

The Radio Association of western New York

<https://w2pe.com/>

Nick's Homebrew radio pages.

http://www.bignick.net/Morgan_Radio/Radio.htm

Antenna matcher, notice the configurations it supports. Same as in Doug Hall's presentation on tuners.

http://www.bignick.net/Morgan_Radio/Radio_18.htm

QSO Today Virtual Ham Expo coming March 13th and 14th 2021

The August 2020 presentations are also listed at this website.

<https://www.qsotodayhamexpo.com/>

Ameco Nuvistor Cascode FM Preamplifier



This FM Preamplifier uses two [RCA 6DS4 Nuvistor](#) vacuum tubes connected in cascode.

Click this link to learn about the differences between cascade and cascode.

<https://www.analogictips.com/cascode-amplifiers/>

<https://www.rars.org>

RARS Classifieds

Copied from <https://www.rars.org/classifieds.php>

The items below were listed within the last 30 days on the RARS website.

Oscilloscopes for sale

Posted September 17th, 2020 by: KM4EP

Contact: jdiepenb@earthlink.net

Yokogawa DL7100, 1 Gs/s 4 channel digital oscilloscope. 500 MHz analog bandwidth, 8 bit vertical resolution, 2 MB acquisition memory depth, monochrome CRT display. GPIB, RS-232, Ethernet, and SCSI interfaces, 3.5" floppy disk drive, RGB video output. Math functions include waveform add/subtract/multiply, integration, differentiation, statistics, power spectrum, X-Y display. All channels working. \$500

LeCroy 9420, 100 Ms/s 2 channel digital oscilloscope. 350 MHz analog bandwidth. 00 Ms/s (transient signals)/10 Gs/s (repetitive signals), 8 bit vertical resolution, 50 KB acquisition memory depth, monochrome CRT display, GPIB and RS-232 interfaces. Glitch detection and trigger capability. Functions include waveform add/subtract/invert, zoom and statistics, and X-Y display. All channels working. \$250

For Sale By Scott Yaesu FT-817 QRP and LDG Auto Tuner LDG Z-817

Middlesex, NC AB4SL

Posted September 13th, 2020 by: AB4SL

Contact: ab4sl73@gmail.com

Yaesu FT-817 QRP Rig LDG Z-817 Auto Tuner (matches FT-817) Interconnecting cables Included FT-817 Rechargeable Battery Pack 9.6v 1700 mAH NI-MH FT-817 Anderson Power Pole Adapter Bluetooth Adapter Wolphilink PSK Android Adapter FT-817 Pocket Reference Printed Manuals \$800 OBO (Sold as an entire group only)

Contact:

Scott AB4SL

AB4SL73@gmail.com

919-280-8444

RARS Classifieds continued

HF Rigs and accessories for sale

Posted September 7th, 2020 by: NR4O

Contact: kb1ri@yahoo.com

I upgraded my rig and now have the following available for sale.

Yaesu FTdx3000 - \$1200

- FH-2 Remote Keypad
- DVK installed
- Hand mic, power cord, original double box
- Excellent condition

Kenwood TS-440SAT - \$400

- Built antenna tuner
- YK88S 2.4khz & YK88C 500hz filters
- IC10 CAT interface chip installed
- Dot problem repaired and installed LED meter lights
- 10 Hz display mod & MARS Mod
- Hand mic, power cord, original box
- Good to Very Good condition

microHam USB micro2R SO2R controller - \$250 (\$315 new)

- used for 1-1/2 years w/FTdx3000 & FT-991
- includes power supply
- Excellent condition

TimeWave Navigator - \$100 (\$374.95 new)

- Used with my Kenwood TS-440SAT
- Manual and Driver CD
- includes power supply
- Excellent condition

If interested you can contact me by email, phone or text.

73, Eric - NR4O

RARS Board Meeting Minutes – August 18, 2020

* This meeting was conducted over Zoom. Next months meeting will be Zoom as well.

In John's absence, [Tom Lewis](#) opened the meeting at 7:13 PM.

The following were in attendance:

Members:

Tom Lewis - N4TL

Greg Seamster - KE4PAX

Mark Kilmer - KM4JRH

Chuck Littlewood - K4HF

Carl Davis - W8WZ

Hank Montgomery - K4HM

Richard Kroeger - N1FUA

Tadd Torborg - KA2DEW

Alan Pitegoff - AB4OZ

A quorum was present and the previous meeting minutes were approved.

Officer/Committee Reports:

Treasurer: - Greg Seamster

Currently have 352 members. 99 members have not renewed from last membership year. We have 14 new members since July 1st. Greg discussed the current budget. The storage unit is paid up through September 25th, 2021 at the same rate as last year. Normally payment to the church is July 1. It was decided not to approach the church for a reimbursement for the months missed due to the virus. The question arose as to when we

RARS Board Meeting Minutes continued

should pay for the upcoming year. Chuck Littlewood suggesting contacting the church to find out their plans for the second half of the year. Carl Davis noted that it is not the church decision but they are under the regulations of the state. Alan reiterated calling the church to discuss what it takes to hold our scheduled position.

Vice President: - Tom Lewis

Noted that plans for VE testing have not changed due to the virus. The September club meeting will be "Antenna Tuners", presented by Doug Hall (K4DSP). October meeting will be Show and Tell and officer nominations. The November slot is open. Tom sent a note to Scott Davis - (N3FJP) asking him to do a presentation on his logging software.

RARSfest Chair - The Board made the decision not to request a refund, due to the possibility of losing our scheduled spot. The monies will be applied to next year.

Field Day Chair: - Bob Starkenburg(Absent)

Tom indicated that Bob has sent him the results of the FD competition to publish in the Exciter.

Exciter Editor: - Tom Lewis

The Exciter is going well. Other clubs are very impressed with the Exciter and have questioned Tom about the software he uses to produce it.

Director at Large: – Alan Pitegoff

Made a second site visit to test the batteries in the 145.130 repeater. Has ordered new battery pack. Noted that about 3 months ago, they had climbers on the tower and checked the antenna and found loose connections, which were tightened and re-taped.

Webmaster: - Hank Montgomery

Everything is set in place until we start having changes as to where and when we are going to start having people being able to get together. Replaced the old Public Service

RARS Board Meeting Minutes continued

stars page with the new page. Currently working on a program to allow Brian to better manage the new page.

Director at Large: Tadd Torborg

TARPN nets are still Trial and Tribulation. Need to establish more node redundancy. Mentioned that some used data center batteries are available for sale.

Action Items:

John Honeycutt:

Send e-mails to each individual who has not renewed membership. (Greg will provide John with an updated list.)

Mark Kilmer:

Contact Bob Starkenburg to determine what his plans are for producing the certificates for Field Day. Notify Greg with his response.

Tom Lewis:

Send e-mail to the Exciter list to determine the number of people wanting to participate in the Show & Tell.

Greg Seamster:

May send another round of renewal notification e-mails, before forwarding the revised list of non-renewal members to John.

Talk to John about the Board discussion concerning payment to the church.

Alan Pitegoff:

Work with Chuck DeCourt to replace batteries in the 145.130 repeater.

New Business:

Chuck Littlewood:

RARS Board Meeting Minutes continued

Normally the Nomination Committee Chair is appointed at the August Board meeting. Tom appointed Chuck. Chuck asked Mark Kilmer, who agreed and was appointed to sit on the committee. Chuck will appoint the other members in the future.

Tom Lewis adjourned the meeting at 8:31 PM

Meeting Minutes submitted by Mark Kilmer, KM4JRH;
Secretary, Raleigh Amateur Radio Society

RARS Membership Meeting – September 8, 2020

The normal club meeting space remains closed, due to the COVID-19, "Stay at Home Order." The meeting was conducted using the Zoom video conferencing software.

The meeting was opened by President John Honeycutt (N8ZU), at 7:30. John requested that all attendees add their callsign to their Zoom display name.

The Pledge of Allegiance was recited.

John called for new members, visitors and those with recent license upgrades to introduce themselves.

New Members:

John Izzo - KO4HLP

Joe Spears - AF1E

Hugh Cashion - KD4WJD

Ben Thedieck - KO4GKH

Justin Diana - KO4FTZ

RARS Membership Meeting – Continued

Eric Wagner - NR4O

Neil Riemann - NR1Y

Mike Eckardt - KK4ETS

Dennis Oestreich – (No call at present) [Note: Denny Oestreich has since received his call – KO4IBL]

A quorum was present. August minutes were approved.

Officer Reports:

President: - John Honeycutt

The RARS Board of Directors meeting will be one week from today. All members are invited. The meeting will be held at 7:00 PM, over Zoom. Login information may be obtained by request from John Honeycutt. John also suggested visiting the RARS classifieds page.

Vice President: - Tom Lewis

Next months meeting will be Show and Tell and officer nominations. Send e-mail to Tom, if you wish to participate in Show and Tell.

Treasurer: - Greg Seamster

Greg reviewed the budget and financial status. Greg also noted the passing of Mirl Austin (W4WMA) and Murry Gavin (AG4BJ).

Secretary: - Mark Kilmer

The new RARS shirt web site is up and shirt orders are now being filled. There is however, a 3 to 4 week delay in turn-around time. This due to COVID-19, which has affected the entire supply chain.

Director and Committee Reports:

RARS Membership Meeting – Continued

Repeater Chair: Chuck DeCourt (Absent)

Alan Pittegoft (AB4OZ) replaced the batteries at the .13 repeater site.

Field Chair: Bob Starkenburg (W4TTX)

Announced the winners of the RARS special Field Day. See Exciter for details. He is working on the award certificates.

ARRL Liaison: Chuck Littlewood (K4HF)

Noted the FCC proposal for charging new fees for licensing. Input can be submitted to the FCC via their “Comment” section.

Additional Announcements:

Alan Pittegoft (AB4OZ):

Announced an upcoming Hamfest in the parking lot at Pleasant Valley Shopping Center. He also announced “Taco Thursday”, a luncheon for technical discussion and trading, selling or buying “stuff”, at Taco Bell in Knightdale. The luncheon will be inside the restaurant in the event of rain. It takes place every Thursday at 11:30. See Alan’s QRZ page (AB4OZ) for details and updates.

Tonight's Program:

Tom Lewis introduced Doug Hall (K4DSP) for the nights presentation, “Antenna Tuners”

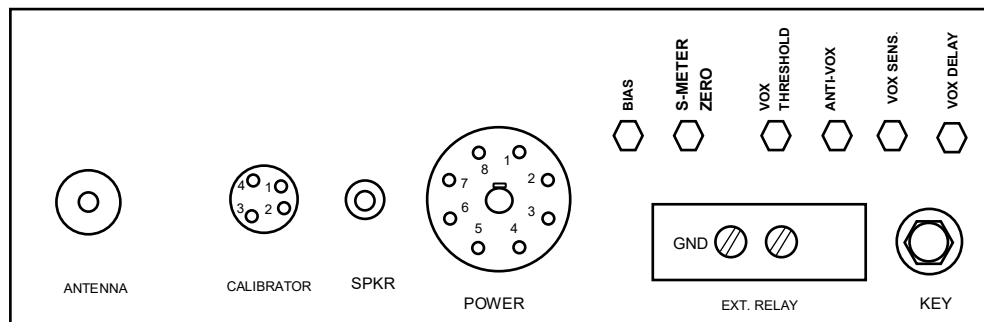
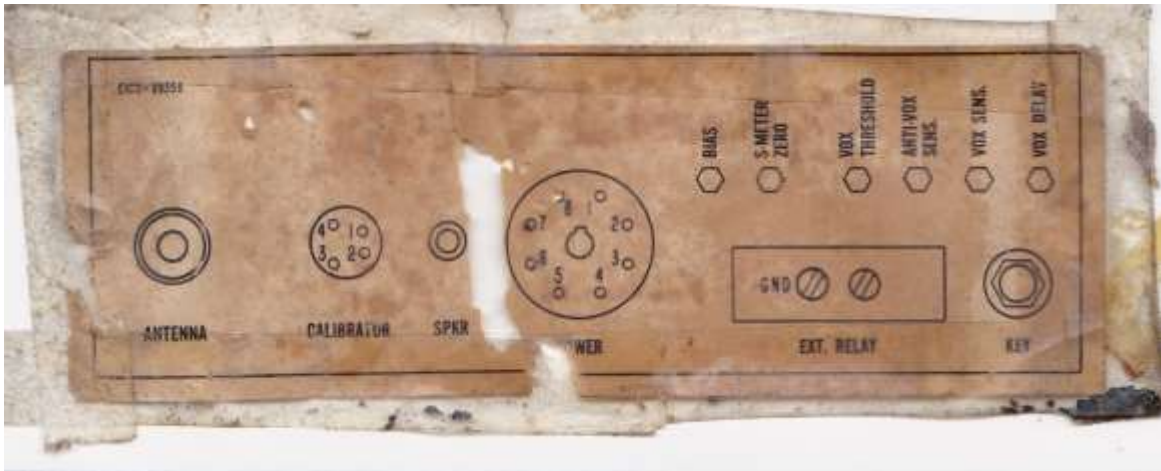
John Honeycutt adjourned the meeting.

* Meeting minutes respectively submitted by Mark Kilmer (KM4JRH), Secretary, RARS.

Microsoft Publisher Program

The Publisher program is useful for duplicating old labels.

The one below is from the back of a Eico 753 Transceiver. By using the publisher program all the lines can be duplicated. The resulting text is printed on card stock and put on the back of the transceiver.



End Fed Half Wave Antenna Installation and Review

By: Carl Davis, W8WZ

It all started because Field Day was cancelled.

Due to the Corona virus social distancing protocols the Raleigh Amateur Radio Society had to cancel our annual group Field Day effort in 2020. Instead, RARS encouraged each member to operate during Field Day from his or her own home. That led me to think about how I would operate. I decided it would be a good time to test out and use my new generator. Then I decided that instead of just operating from my shack I might like to spend some time operating from the back porch. Then I decided it might be nice to regularly operate from the back porch. That meant that I needed an antenna that I could use from the back porch. The two HF antennas I had at the time were both inverted Vees fed with ladder line. One is cut for 80 meters and fed with open wire 600ohm feeders and is up 100 feet at its apex. The other is a total of 100 feet long and center fed with commercial 450ohm window line. That antenna is up at an apex of about 70 feet. Neither one could be easily accessed from the back porch because getting the feedlines into the station took a good bit of work and I did not want to mess with them now that they were set up. This meant that the solution would be a third antenna.

My city lot is small but it abuts a woods and I have a few 100 feet tall trees (oaks and pines) in the back of my yard that make great antenna hangers. But since I already have two full size HF antennas in the yard, I was limited for third antenna options. I do not have any deed covenant restrictions or restrictive zoning. However, I am particular about the appearance of my yard and did not want an antenna that would particularly draw attention to itself. I first considered a vertical that could fit in an open space behind my shed. I have used verticals in the past and found them to be fine antennas. However, I decided against that option in this case because for Field Day (and other nets I participate in on 80 meters) I wanted my 80-meter ground wave signal to be horizontally polarized as much as possible because verticals don't do a great job of allowing us to work nearby stations on 80 meters and I wanted to do that for Field Day and nets.

That is when I began to look at the end fed antennas that have gained popularity in recent years. I talked with several friends who use them and read several different articles about them. My fellow QCWA Piedmont Chapter 126 weekly 75-meter net participants were very helpful in sharing their experiences. I had never really been that excited about them in the past. In college I end fed a random wire that I threw out the window into some trees and used the dorm room ra-

diator as ground. That resulted in some fun contacts and also in a lot of RF in the “shack”. I also questioned the efficiency and power handling abilities of the torrid matching systems I saw being used in these new antennas. But, I thought this might be a good opportunity to try something new. So I decided to go that route.

I looked at several different end fed antenna options. Some require the use of a long coax feedline. I decided against those options thinking that meant that they don’t really have a good match at their feed point and are using a section of lossy coax to hide that bad match from the SWR meter at the transmitter or they are prone to excessive common mode current issues and using long coax to try and minimize that problem. I also stayed away from designs that said coax feed line length had to be a certain length based on wavelength. That made me think that they were using the feedline as part of the antenna system’s matching process and that it would also radiate. I didn’t want that. Some designs said that a tuner will be needed. I do not like using coax at high SWR under any circumstances. Even the best coax has unacceptable loss when SWR is high. For high SWR situations I only use ladder line. So I discarded any antenna that said a tuner would be needed. I also wanted an antenna that could handle legal limit power. Even though I would not be using more than 100 Watts for Field Day, I wanted the option to use my amplifier with the antenna in the future.

Considering these criteria led me to the EFHW-8010 made by Myantennas.com <https://myantennas.com/wp/product/efhw-8010/> I ordered the antenna from their webpage and within a few days it was in my mailbox and ready for installation. The antenna appeared very well built and it was well packaged.

I considered the different ways this antenna can be mounted and I decided on an Inverted L configuration. My thinking for this was based on the fact that I have tall vertical supports nearby and it is easier for me to go up than across on my property and that if I went horizontal at less than $\frac{1}{2}$ of a wavelength my radiation angle would be unhelpfully high. While I want to make good local contacts on 80 meters, I did not want an NVIS system on any band higher than 80 meters. My plan was to go up 66 feet and then go horizontal for the remaining 66 feet. I wanted to run the horizontal section to the South so that my radiation lobes would go East/West. Since I live in North Carolina, an East/West pattern is nice as it covers both the rest of the United States as well as Europe. I thought this system should give me both vertical and horizontal radiation and the horizontal radiator will be adequately high for all bands except 80.

There was a 4”x4” fence post in my back yard in exactly the right spot behind the shed. So

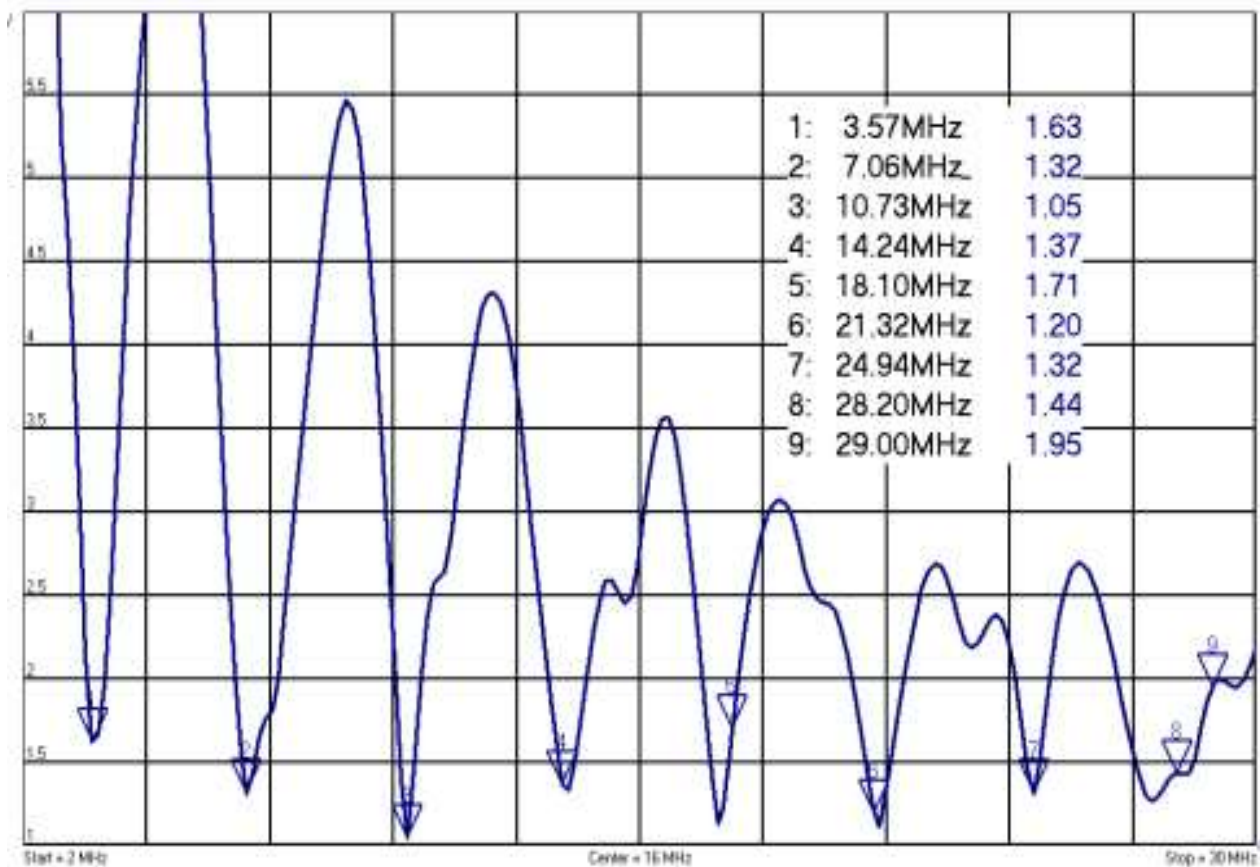
I drove an 8-foot ground rod into the ground at its base and mounted the antenna's matching section to that fence post. I then grounded it to the ground rod.

My friends Al (N4EII) and Mark (KM4JRH) came over with two potato guns, a bow and arrow, a sling shot, yards and yards of para cord and lots of fishing line. The installation began. The first shot was over an oak tree limb above the antenna to support the vertical portion of the inverted L. We thought it to be about 60 to 65 feet up. Al made the shot perfectly on the first try with his compressed air powered launcher. Once we got the wire into the tree we realized it was actually 80 feet up. We decided that was fine. Mark then went into the woods and found a tree at the correct height and distance to our South to support the horizontal section of the antenna. Al again made a perfect shot with his launcher. We discovered that it was best to attach 50lb test fishing line to the lightweight fishing line that his launcher used and then reel in the light weight line so that the 50lb test was over the tree. Then we could connect the Dacron para cord to the 50lb line and haul it up. Then we could attach the antenna to the para cord and raise the antenna. We learned that lesson on another antenna project we did that had much more comical results than this one. Once the antenna was in the trees as we desired it, we tied it off leaving plenty of slack in the system for trees to sway in the wind. Because this antenna is tied off in a woods where other people have access, I decided against using a weighted counterweight to support it as that may draw the attention of curious people. Instead I tied it off rather high on a tree where it is not noticeable.

So the finished antenna is an inverted L with an 80-foot vertical section and 50-foot horizontal section. The horizontal section runs from the North to the South at a height of 80 feet. The feed point is about 42 inches above ground and the antenna is grounded according to the manufacturer's instructions to a driven 8-foot ground rod just below the feed point. That ground rod is bonded to my house's ground system via buried #6 solid copper wire.

Next we hooked up the antenna analyzer. The antenna looked very good on the analyzer. Mark has a very nice Rig Expert analyzer that connects to his computer. We measured that antenna at the feed point and it looked very close to the way that the manufacturer's webpage said it should look. SWR is less than 2:1 on all amateur bands 80-10 except on 30 Meters where it is around 3:1 and needs the use of the radio's built in tuner and also on the area around 29 Mc which I do not use often. Then we put 100 feet of coax on the antenna and ran that to the back porch. The antenna looked the same there as it did at the feed point. I finally started to get excited about these end fed antennas.

The chart below is from the manufacturer's webpage:



The data table below is as it is measured at W8WZ:

Frequency	SWR from webpage	SWR Measured
3.57	1.63	1.2
7.06	1.32	1.8
10.73	1.05	Not a ham band
10.1	Not on webpage	3.1
14.24	1.37	1:1
18.10	1.71	1.7
21.32	1.20	1.5
24.94	1.32	1.2
28.20	1.44	1.5
29.00	1.95	3.5

I will note that I can go as far into the phone band on 75 meters as 3.855 Mc before the SWR goes above 2:1. The company makes a different antenna that is designed for the 75-meter phone band. I chose the model that is designed for the 80 meter CW band as I operate there more often. On 40 Meters (the band I use most) the SWR is 1.8:1 on 7Mc. It is 1.7:1 on 7.028Mc (my favorite frequency to rag chew on) and 1.3:1 up in the phone section.

After I knew that I could effectively couple RF into the wire I wanted to know how it actually performed. So the next day I patched together 200 feet of cheap RG58 Coax that I had laying around for use at Field Day or other portable set ups and brought the antenna feedline up into my radio shack. I put it on an A/B coax switch and compared it against the inverted Vee at 70 feet. It compared very favorably. Sometimes the End Fed was better and sometimes the Inverted Vee was better. There was no clear winner. The Inverted Vee often gave me higher signal strengths but a less desirable signal to noise ratio than the End Fed gave. Other times one was clearly better. I decided to call CQ on 40 CW on both antennas and see what numbers the Reverse Beacon Network system gave me. Here are the results of that initial test. As you can see, they matched my observation that there was no clear winner.

RBN Station	EFHW	INV VEE
W1NT/6	14	37
WE9V	24	20
K9TM-4	8	0
KQ8M	19	20
K2DB	13	0

Saying that the new antenna is at least equal to the old one was great news because my old antenna is a very solid performer. The new antenna has an advantage beyond its actual performance too, namely; ease of use. The Inverted Vee fed with ladder line requires me to adjust the tuner and sometimes the amplifier load control whenever I change frequencies. While this is not a hardship for most operations, it does slow me down in contests. I estimate that it costs me 1 to 2 QSOs every time I need to change bands based on my average QSO rate. It was also much easier to install than a dipole (even a dipole hung as an Inverted V. Also the ability to use coax as a feedline allows me to run the feedline in ways I cannot run the ladder line and to use a polyphaser for lightening protection with great ease.

So, I decided that I did not want to only be able to use this new antenna from the back porch. Instead I wanted to have access to it both on the porch and in the main shack. That meant finding the best coax feedline for this antenna. I wanted a feedline that was low loss, could handle full power, could be buried and would be UV resistant. I decided on the DX Engineering 400Max coax as the best way to meet those requirements. I also ordered a polyphaser lightning arrestor from DX Engineering at the same time.

My friend Ken (AD4GX) came over with a gas powered edger and dug a trench from the antenna feed point across the back yard to the house. In that trench we buried the ground wire that bonded the antenna ground to the house ground and the direct burial coax.

The coax comes out of the ground at the house where it connects to a polyphaser that is grounded at the house ground. Then another section of coax takes it to an A/B switch mounted (along with the polyphaser) on the side of the house inside of a water proof box that has a hinged door on it. 2-inch copper strap from Georgia copper connects the polyphaser to the ground rod. I can open the box, and switch between A and B. Side A allows me to connect a run of coax and sit on the back porch to operate. Side B connects to more DX Engineering 400 coax that is mounted to the side of the house and goes up into my radio shack.

To get the coax into the radio shack, I used a simple and inexpensive method. I cut a 2x4 the length of the window and set it in the window sill. I then shut the window on top of it and painted it to match the window. I drilled a hole in the 2x4 and put the coax through the hole. I also ran a heavy duty extension cord through the hole and ran it next to the coax to the back porch through next to the coax. That allows me to plug my generator in to that extension cord easily. That way when the power goes out I can simply put the generator on the back porch and plug it in. Then plug my station into the extension cord instead of the wall outlet. This allows me to get on generator back up quickly and avoids the need to run extension cords out of windows during a bad storm. I used this power set up for Field Day and operated as 1 E. I then caulked around the board and the window and filled the hole in with caulking around the coax and the extension cord.

If I was only able to have one of my 3 HF antennas. I would choose to keep this one. It performs very comparably to the Inverted Vs that I have and it is automatically band switching. It is less visible from the street than my inverted Vs and is easier to install. It also works better on 10-meter ground wave for our local nets than any of my other antennas do. I suggest getting the high powered version of the antenna as I did as it is nice to have the ability to use the amplifier with it. While this antenna can work in many different configurations, I believe the Inverted L is a good

way to use it because it allows the benefit of feeding it near the ground and still allows you to keep good radiation angles on all the bands.

Many thanks to KM4JRH, N4EII and AD4GX for their many hours of hard work helping me get this antenna operational. Also thanks to N4TL who helped me figure out the best way to ground the station by sharing a great video about grounding and to K4HF who shared information with me about EFHW antennas when I was deciding which one to purchase.

All this started because Field Day was cancelled. Every cloud has a silver lining!

I used this set up with great success for Field Day coming in with a score of 1258 points which is pretty good for me working 1E (all CW). I have also used it in many CWT mini contests on Wednesdays and it works very well. I use it on local nets and to work DX. If I could just have one antenna this would be it.

Picture 1 – The Antenna's location.



This picture shows where the antenna is mounted. As you can see it is not easily viewed at all. Even though I do not have any HOA or restriction issues. I think this antenna could be used in an environment where such concerns exist with great effect. The antenna is mounted on a fence post behind the tree shown just to the left of the tool shed. That tree provides the vertical support.

Picture 2 – The antenna mounted on the fence post



This fence post is behind the tree in picture one. You can see the ground rod at its base. The coax is buried along with the ground wire bonding that rod to the house. The wire goes up 80 feet supported by the tree before going horizontal.

Picture 3 – The buried feed line and ground wire



Here you can see the trench that AD4GX dug with the machine in the picture and the coax temporarily suspended above the ground before we put it into the trench. Within a week the grass had grown over the trench and there is no sign of it now. You can also see the 600 ohm feeders from one of my other antennas in the upper right of the picture. That is suspended at an elevation of 10 feet across the back yard.

Picture 4 – AD4GX Deciding the path for the trench.



Picture 5 – KM4JRH working on the waterproof junction box for the polyphaser and the co-ax switch that allows me to use the antenna on either the porch or in the radio shack.



Picture 6 – The coax and electric cords mounted on the side of the house going into the radio shack. You can also see the open wire and ladder line feeders coming in.



The End

How To MANUALLY PROGRAM THE BAOFENG UV-5R

Howard A. Goodman, N4KYW

Every other ham I know has a Baofeng UV-5R hand-held dual-bander. At an average price of \$26, who among us can resist? My son, KI4OCF, owns two. Most owners, I suspect, also purchased the programming cable, to make it easier to add and store repeater and simplex frequencies. But my feeling is, they could have saved a few bucks because programming of the UV-5R using the keypad, I discovered, is also easy.

The issue with manual programming, in my opinion, is simply that there is a plethora of misinformation out there, in both text and in How-To videos. In defense of those who have attempted to share their knowledge with the rest of us, via YouTube or elsewhere on the Internet, the issue, I've concluded, is that while they were successful at manually programming their own UV-5Rs, they have done, shall we say, less than a stellar job of conveying to the reader or viewer exactly how they did it.

Only Mike, M7MMC, in his YouTube video (<https://www.youtube.com/watch?v=4UXMBjdwx0s>) came closest to perfection but confused me during his brief quip about programming the transmit frequency.

So I felt it was my duty, both as a ham and a technical writer, to put pen to paper and explain in sufficient (but not excessive) detail the steps in successfully programming the UV-5R. The following step-by-step instructions were kitchen-tested by me but should work in any room of your house.

Make sure the UV-5R's battery is fully (or nearly fully) charged.

Power on the UV-5R by twisting the top knob clockwise, to about mid-range, so you can hear the synthetic female voice.

Press the orange **VFO/MR** button until the female voice says, "FREQUENCY Mode." By the way, if the female voice is speaking in Chinese, do the following to remedy; otherwise, someone may show up at your door with an order of dim-sum.

On the keypad, press the Menu button, followed by the numerals 1 and 4. Result: The screen displays the VOICE Menu (14).

Press the Menu button again. Result: The VOICE Menu is selected and ready to be programmed.

Now press either the up or down arrow key on the keypad until **ENG** displays.

Press Menu one more time to confirm your voice language selection. Then press the Exit button to exit the menu structure.

NOTE: The UV-5R can only store frequencies that are programmed from the upper line of the two-line display (A). To select the upper line, press the blue A/B button until an **up-arrow** displays to the left of the current frequency display.

The UV-5R is now ready to accept some serious frequency, offset, shift, and CTCSS tone programming.

In the following exercise, we will use a comprehensive example, namely a frequency for a repeater that requires a CTCSS tone: K4ITL.

Receive Frequency	Frequency Offset	Offset Direction	CTCSS Tone
145.210	600 kHz	Minus (down)	82.5 Hz

RECEIVE FREQUENCY

Using the keypad, enter all six digits of the frequency you wish to program into the UV-5R (145.210). Result: The receive frequency just programmed displays on the top line.

FREQUENCY OFFSET (TRANSMIT FREQUENCY)

Press the Menu button, followed immediately by the numerals 2 and 6. Result: The OFFSET Menu displays.

Press the Menu button again. Result: The OFFSET Menu is selected and ready to be programmed.

Now using the keypad, type in all six digits for the amount of frequency offset required by this repeater (000.600). Result: The frequency offset will display.

Press Menu one more time to confirm your frequency offset selection. Then press the Exit button (or wait a few more seconds). Result: The screen exits the menu structure.

SHIFT DIRECTION

Press the Menu button, followed immediately by the numerals 2 and 5. Result: The SFT-D Menu displays.

Press the Menu button again. Result: The SFT-D Menu is selected and ready to be programmed.

Press either the Up or Down arrow key until the desired shift direction displays.

Press Menu one more time to confirm your offset shift selection. Then press the Exit button to

exit the menu structure.

CTCSS TONE FREQUENCY

Press the Menu button, followed immediately by the numerals 1 and 3. Result: The screen displays the CTCSS Menu.

Press the Menu button again. Result: The CTCSS Menu is selected and ready to be programmed..

Press either the Up or Down arrow key until the desired CTCSS tone displays.

Press Menu one more time to confirm your CTCSS tone selection. Then press the Exit button to exit the menu structure.

EMPTY A MEMORY CHANNEL TO STORE THE NEW PARAMETERS

NOTE: Before you can store the above parameters in a particular memory channel, you must verify that the desired channel number is **empty**.

Press the Menu button, followed immediately by the numerals 2 and 8. Result: The DEL-CH Menu displays.

Press the Menu button again. Result: The DEL-CH Menu is selected and ready to be programmed..

Press either the Up or Down arrow key until the desired channel number displays.

Press Menu one more time to confirm your selection of the channel to be emptied. Then press the Exit button to exit the menu structure.

STORE THE NEW PARAMETERS IN THE DESIRED CHANNEL

Press the Menu button, followed immediately by the numerals 2 and 7. Result: The MEM-CH Menu displays.

Press the Menu button again. Result: The MEM-CH Menu is selected and ready to be programmed.

Press either the Up or Down arrow key until the desired channel number displays.

Press Menu one more time to confirm your selection of the channel to be written to. Then press the Exit button to exit the menu structure.

VERIFY ABOVE PARAMETERS WERE STORED IN DESIRED CHANNEL

Press the orange **VFO/MR** button until the female voice says, "CHANNEL Mode."

Press either the Up or Down arrow key until the new channel number displays. Result: The new frequency (145.210) displays.

A FINAL THOUGHT

Though the Baofeng UV-5R functions are well labeled and organized, the tech writer in me discovered one inconsistency. And you may have already spotted it, too, in this article. This inconsistency has to do with the naming convention for the two modes: When you switch modes, the female voice says, "Frequency Mode," or "Channel Mode." However, the orange button used to switch between modes is labeled, "VFO/MR."

Bottom line: Nobody's perfect.

HOMEWORK ASSIGNMENT

Using the above instructions, program a simplex channel. Just remember that for all simplex channels,

OFFSET = 000.000

SFT-DIR = OFF

CTCS = OFF.

